

ARRAY SOLUTIONS

VHF & UHF COUPLERS VHF-500, VHF-500-2, UHF-500 VHF-1.5K, VHF-1.5K-2, UHF1.5K

INSTALLATION & OPERATION MANUAL

P/N: 100452 REV: A

1-1 INTRODUCTION

The Array Solutions VHF and UHF couplers extend the frequency range of the Power Master Series Digital RF Power & V.S.W.R Indicator to the 2m, 1.35m and 70cm amateur bands.

The VHF and UHF series couplers are precision dual directional couplers. They have dual pickup loops to provide simultaneous forward and reflected power measurements.

2-1 INSTALLATION PROCEDURE

The Power Master VHF and UHF couplers may be inserted in the antenna feedline at any convenient point. The end of the coupler that is marked "ANT" is connected to the feedline that goes to the antenna. The other end is connected to the transceiver or linear amplifier (see V.S.W.R. accuracy section).

The cable with 1/4" phone plug is plugged into the Power Master display unit.

To use the Power Master Digital RF Power & V.S.W.R. Indicator on 144, 222 or 432 MHz, the proper firmware must be loaded in the Power Master. Firmware may be downloaded from the Array Solutions web site.

www.arrayolutions.com/manuals.htm

COUPLER MODEL	FREQUENCY MHz	FIRMWARE
VHF-500 VHF-1.5K	144 - 148	VHF144
VHF-500 VHF-1.5K	222 - 225	VHF222
VHF-500-2 VHF-1.5K-2	222 - 225	VHF222-2
UHF-500-2 UHF-1.5K-2	420 - 450	UHF440

For best accuracy the trim factor must be entered for both forward and reflected power, The trim factors are marked on each coupler. Refer to the Power Master Manual for instructions on setting the trim levels.

3-1 OPERATION

With the proper firmware loaded, operation and display features are the same as with a HF coupler. Refer to the Array Solutions Power Master Series Digital RF Power Meter manual for instructions on the Power Master Series operating procedures and display features.

3-2 V.S.W.R. ACCURACY

The accuracy of power and V.S.W.R. Readings at VHF and UHF frequencies can be different than at HF due to the length of the feedlines at these frequencies in wavelengths.

Given that an antenna will not have a perfect 50 ohm impedance (1:1 V.S.W.R.), there is always mismatch (V.S.W.R) present. This mismatch creates standing waves on the transmission line. These standing waves will add and subtract at ¼ wavelength intervals and create different V.S.W.R readings depending on where in the transmission line the coupler is inserted.

At HF, an antenna feedline can be short in terms of wavelengths. For example at 3.5 MHz, one wavelength is 281 feet in free space and 185 feet on a RG-8 type coaxial transmission line that has a 66% velocity factor.

That is a typical 100 foot long feedline to an 80m dipole is about 2 ¼ wavelengths long. This means that at 3.5 MHz, a Power Master HF coupler would have to be moved almost 50 feet along the antenna feedline to see a significant difference in the apparent V.S.W.R reading.

At VHF and UHF frequencies the situation is quite different. At an operating frequency of 432 MHz, a ¼ wavelength on a RG-8/U transmission line is only 4.5" long. A 100 foot long transmission line will have 266 ¼ wavelengths. That means by placing a UHF-500

coupler in different positions along the transmission line that are only 4.5" apart, significantly different V.S.W.R readings can be obtained.

Differences in V.S.W.R readings that occur due to connecting the Power Master coupler in different positions along the antenna feedline does not indicate a problem with the Power Master. Differences in V.S.W.R readings that are observed by either changing the length of the antenna feedline or by changing the location of the Power Master coupler along the feedline, indicate an antenna mismatch and not a problem or limitation in the Power Master coupler or display unit.

4-1 CARE AND MAINTENANCE

There is no maintenance required for the VHF / UHF couplers. There are no user adjustable components inside the couplers. Do not remove the coupler cover or disassemble it in any way as calibration will be lost.

Avoid anything that would apply a significant shock to the couplers such as dropping them or hitting them with any object. A mechanical shock can cause movement in the pickup loops which would affect the accuracy of the couplers.

Should you suspect a problem with your VHF or UHF coupler call Array Solutions for instructions on how to return the unit for repair and calibration.



5-1 SPECIFICATIONS

MODEL	VHF-500 & VHF-1.5K
Frequency Range	144 - 148 MHz at full performance 222 -225 MHz with reduced capabilities
Line Impedance	50 ohms nominal <1.05 V.S.W.R. type N <1.11 V.S.W.R. UHF
Insertion Loss	.05 dB or less
Line Connections	Type N Female (UG-58) UHF (SO-239) optional
Power Ranges VHF-500	1 - 500 watts (144 - 148 MHz) 1- 300 watts (222 - 225 MHz)
Power Ranges VHF-1.5K	1 - 1,500 watts (144 - 148 MHz) 1 - 1,000 watts (222 - 225 MHz)
Directivity	>25 dB typical 144 - 148 MHz >22 dB typical 222 - 225 MHz
Accuracy	<+/- 5% of reading

MODEL	VHF-500-2 & VHF-1.5K-2
Frequency Range	222 -225 MHz
Line Impedance	50 ohms nominal <1.06 V.S.W.R.
Insertion Loss	.07 dB or less
Line Connections	Type N Female (UG-58)
Power Range VHF-500-2	1 - 350 watts continuous 1 - 500 watts intermittent
Power Ranges VHF-1.5K-2	1 - 1,000 watts continuous 1 - 1,500 watts intermittent
Directivity	>24 dB typical
Accuracy	<+/- 5% of reading

MODEL	UHF-500 & UHF-1.5K
Frequency Range	420 - 450 MHz
Line Impedance	50 ohms nominal <1.07 V.S.W.R.
Insertion Loss	0.1 dB or less
Line Connections	Type N Female (UG-58)
Power Ranges UHF-500	1 - 250 watts continuous 1- 500 watts intermittent
Power Ranges UHF-1.5K	1 - 750 watts continuous 1 - 1500 watts intermittent
Directivity	>23 dB typical
Accuracy	<+/- 5% of reading